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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/747,717   | 12/29/2003  | Lance A. Baird       | 107293              | 5877             |
| 23490  | 7590        | 08/09/2006           | EXAMINER            |                  |
| JOHN G TOLOMEI, PATENT DEPARTMENT<br>UOP LLC<br>25 EAST ALGONQUIN ROAD<br>P O BOX 5017<br>DES PLAINES, IL 60017-5017 |             |                      | WARTALOWICZ, PAUL A |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1754                |                  |
| DATE MAILED: 08/09/2006  |             |                      |                     |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                 |                  |
|------------------------------|---------------------------------|------------------|
| <b>Office Action Summary</b> | Application No.                 | Applicant(s)     |
|                              | 10/747,717                      | BAIRD ET AL.     |
|                              | Examiner<br>Paul A. Wartalowicz | Art Unit<br>1754 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 18 May 2006.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-4 and 6-13 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4 and 6-13 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## DETAILED ACTION

### ***Withdrawn Rejections***

The 35 USC 103 rejections of claims 7 and 12 in view of Seachrist et al. '809 have been withdrawn. Therefore, the arguments regarding this rejection are now moot.

### ***Response to Arguments***

Applicant's arguments filed on May 18, 2006 have been fully considered but they are not persuasive.

Applicant argues that the '809 reference fails to disclose a process to produce a net hydrogen product stream is determined and then the flow rate of the reforming catalyst passing through the reforming zone(s) is reduced to thereby reduce the concentration of carbon monoxide in the net hydrogen product stream.

This argument is not persuasive for the following reason: Seachrist is not relied upon to teach a net hydrogen product stream is determined and then the flow rate of the reforming catalyst passing through the reforming zone(s) is reduced to thereby reduce the concentration of carbon monoxide in the net hydrogen product stream. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that the sorption zone is incorrectly referred to as "a second catalytic zone" and that a reduction zone is located above and upstream of the three reforming zones

Applicant argues the '201 reference reason for minimizing the concentration of carbon monoxide in the effluent is to ensure that the coke is completely removed from the spent catalyst by complete combustion thereof and that a person skilled in the art would not select the '201 reference to modify the '809 reference in order to arrive at the process of the present invention.

This argument is not persuasive for the following reason: In response to applicant's argument that the reason for minimizing the concentration of carbon monoxide in the effluent is to ensure that the coke is completely removed from the spent catalyst by complete combustion thereof, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The rejection using the '201 reference is based upon the combination of the '809 and '201 reference and not the present invention and the '201 reference such that the motivation must be between the '809 reference and the '201 reference.

Applicant argues that the measurement of carbon monoxide in the present invention is to determine the required change in flow rate of the reforming catalyst passing through and that the purpose of measuring the carbon monoxide conversion in

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the '103 patent is to determine the activity of the catalyst and that the '103 reference would not be an incentive to a person skilled in the art to modify the '809 patent.

This argument is not persuasive for the following reason: In response to applicant's argument that the measurement of carbon monoxide in the present invention is to determine the required change in flow rate of the reforming catalyst passing through and that the purpose of measuring the carbon monoxide conversion in the '103 patent is to determine the activity of the catalyst, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The rejection using the '103 reference is based upon the combination of the '809 and '103 reference and not the present invention and the '103 reference such that the motivation must be between the '809 reference and the '103 reference.

Applicant argues that there is a failure to promulgate a prima facie case of obviousness and, therefore, strongly disagree that the combined teachings of the three references inherently teach the limitation wherein a neat hydrogen product stream contains from 0.1-20 ppm carbon monoxide.

This argument is not persuasive for the following reason: Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Applicants argue that the purpose of the process of the '280 reference is to produce on-purpose hydrogen and carbon monoxide which contrasts the purpose of the present invention of catalytic reforming of a hydrocarbon feedstock to produce high octane gasoline and a net hydrogen product stream containing essentially no carbon monoxide.

This argument is not persuasive for the following reason: In response to applicant's argument that the purpose of the process of the '280 reference is to produce on-purpose hydrogen and carbon monoxide which contrasts the purpose of the present invention of catalytic reforming of a hydrocarbon feedstock to produce high octane gasoline and a net hydrogen product stream containing essentially no carbon monoxide, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Applicant also argues that the process of the present invention is the catalytic reforming of a hydrocarbon feedstock to produce high octane gasoline. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., catalytic reforming of a hydrocarbon feedstock to produce high-octane gasoline) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4, 6, 8-11, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seachrist et al. (U.S. 6117809) in view of Castagnos, Jr. et al. (U.S. 4430201) and Ruettinger et al. (U.S. 2002/0147103).

Seachrist et al. teach a process for a catalytic reforming process (col. 8, lines 52-55) wherein the first three reformers in the process are maintained at a temperature of 454°C to 538°C and a pressure of from 50 to 200 psi comprising a reforming catalytic zone (col. 16, lines 3-8) wherein a hydrogen to hydrocarbon mole ratio is from about 1-5 (C<sub>1</sub>-C<sub>6</sub> hydrocarbons, col. 11, lines 58-62) wherein catalyst particles are spherical (col. 9, lines 30-32) wherein the catalyst particles pass downwardly from the bottom of reduction zone through multiple stages of reaction (catalyst flow from the top to the bottom of the stacked reactor arrangement, col. 16, lines 48-55). Seachrist et al. fail to

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teach wherein the catalytic reforming process comprises four reforming zones, wherein the process comprises determining a concentration of the carbon monoxide in the net hydrogen product stream and reducing the flow rate of the reforming catalyst passing through the reforming zone to thereby reduce the concentration of carbon monoxide in the net hydrogen product stream.

As to the limitation of the catalytic reforming process comprise four reforming zones, Seachrist et al. teach a process in which the catalytic reforming process comprise three reforming zones (col. 16, lines 3-8) such that adding a fourth reforming zone would be an obvious variation because of the reasoned explanation that it is well known to add multiple reactors in series to achieve a higher conversion of substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide adding a fourth reforming zone in Seachrist et al. because of the reasoned explanation that it is well known to add multiple reactors in series to achieve a higher conversion of substrate and that adding a fourth reformer after the third reformer in series would be obvious in order to achieve higher conversion of hydrocarbons.

As to the limitation wherein reducing the flow rate of the reforming catalyst passing through the reforming zone to thereby reduce the concentration of carbon monoxide in the net hydrogen product stream, Castagnos, Jr. et al., however, teach a process for regenerating catalyst in hydrocarbon conversion reactions (col. 1, lines 4-8) wherein catalyst circulates between upper and lower zones of the reactor at rates of 25-

35 lb/ft<sup>3</sup> and wherein the rate of the flow rate of the catalyst is optimized for the purpose of completing carbon monoxide combustion (col. 5, lines 20-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the flow rate of the catalyst, since it has been held that discovering an optimum value or a result effective variable involved only routine skill in the art. *In re Boesch*, 617 F.2<sup>nd</sup> 272, 205 USPQ 215 (CCPA 1980). The artisan would have been motivated to optimize the flow rate of the catalyst by the reasoned explanation that the flow rate of the catalyst may be optimized for the purpose of completing carbon monoxide combustion.

As to the limitation wherein determining a concentration of the carbon monoxide in the net hydrogen product stream, Ruettinger et al., however teach a process for generating carbon monoxide and hydrogen from hydrocarbons (paragraph 0002, lines 5-9) wherein CO conversion in the outlet stream is measured for the purpose of determining the activity of the catalyst (paragraph 0112, lines 1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide for the measurement of CO conversion in the outlet stream in Seachrist et al. in order to determine the activity of the catalyst (paragraph 0112, lines 1-6) as taught by Ruettinger et al.

As to the limitation wherein the net hydrogen product stream has a reduced concentration of carbon monoxide from about 0.1 to about 20 vppm carbon monoxide, the combined teachings of Seachrist et al., Castagnos, Jr. et al., and Ruettinger et al. teach a process as described above. The process of the combined teachings of

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Seachrist et al., Castagnos, Jr. et al., and Ruettinger et al. is similar to that of the applicant and inherently teaches the limitation wherein a neat hydrogen product stream contains from about 0.1 to about 20 vppm carbon monoxide.

Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seachrist et al. (U.S. 6117809) in view of Anumakonda et al. (U.S. 6221280).

Seachrist et al. teach a process for catalytic reforming as described in claims 1, 7, and 13. Seachrist et al. fail to teach wherein a liquid hourly space velocity from about 0.5 to about 4 hr<sup>-1</sup>.

Anumakonda et al., however, teach a process for the catalytic partial oxidation of hydrocarbons (col. 1, lines 6-10) wherein the liquid hourly space volume of greater than about 0.5 h<sup>-1</sup> is maintained for the hydrocarbon flow (col. 11, lines 13-16) for the purpose of controlling the contact time in which the hydrocarbon is contacted with the catalyst (col. 11, lines 15-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein the liquid hourly space volume of greater than about 0.5 h<sup>-1</sup> is maintained for the hydrocarbon flow (col. 11, lines 13-16) in Seachrist et al. in order to control the contact time in which the hydrocarbon is contacted with the catalyst (col. 11, lines 15-20) as taught by Anumakonda et al.

***Conclusion***

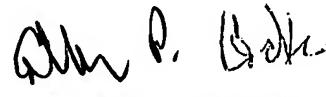
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Paul Wartalowicz  
August 4, 2006



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